A Report on Water Quality to the Citizens of Durham

The State of Our Streams

August, 2005

Water quality, from the stream to the tap, affects us all. We depend on clean surface water (streams and lakes) for many uses such as drinking, recreation, and to support aquatic life.

In-stream water quality monitoring indicates whether streams meet their intended uses according to federal and state guidelines. Nationwide, more than 40 percent of all monitored waters fail to meet water quality standards. Urban streams account for a significant portion of polluted waters. Poor stream water quality creates health risks, lowers property values, and harms wildlife habitat.

Recognizing the impact that this pollution is having, the City of Durham developed a stormwater management plan to restore water quality. Water quality monitoring is a key part of this plan.

This first annual State of Our Streams report summarizes water quality conditions in our urban streams. By understanding the conditions in our streams, community members are more aware of problem areas and can help the City find and eliminate pollution sources. One way citizens help in that effort is through calling the water pollution hotline (560-SWIM). Since the hotline began in 1996, citizens have helped to find many pollution sources. An average of 67 calls come in to the hotline each year.

Understanding pollution at its source helps protect our water resources.

602 ***The number of water quality investigations initiated by citizens since 1996.***

Water Quality Monitoring Program

The City of Durham monitors water quality in local streams under its National Pollutant Discharge Elimination System (NPDES) stormwater permit and comprehensive stormwater management program.

The City collects water quality data that indicate risks to human health, drinking water supplies, and aquatic life support.

Water Quality Index

To provide an overall picture of the health of our streams, Stormwater Services combines all of the measurements of water quality into a ***water quality index***. The water quality index is like a numerical "grade" for our streams. It indicates overall progress in cleaning up the streams.

The water quality index can also be used to identify target areas for clean-up and to communicate stream conditions to citizens. The City has limited staff and resources to

Water Quality Indicators

The following are some of the measurements that help determine the health of a stream.

Biochemical oxygen demand: Measures how much oxygen is used by decaying organic matter (leaves, plants, etc). Pollution increases organic matter and leads to low-oxygen conditions in streams.

Fecal coliform bacteria: Leaky sewers, failed septic tanks, and animal wastes are sources of these bacteria that indicated a threat to human health.

Nutrients (e.g. nitrogen, phosphorous): Fertilizer and other stormwater pollutants that drain to streams can cause algae blooms. This makes the water look and smell unpleasant and uses up oxygen needed by fish.

Turbidity: Too much fine sediment clouds water and smothers aquatic life.

City of Durham Stormwater Services - (919) 560-4326
http://www.durhamnc.gov/departments/works/stormwater.cfm
Design/Plan Review - Drainage/Flooding Concerns - Floodplain Information
Stormwater Public Education - Surface Water Quality

improve water quality. Therefore, it is essential that citizens become involved and provide additional eyes, ears, and noses to help find and eliminate sources of pollution.

The index provides a water quality "grade" that ranges from 0 to 100. Because all urban streams generally fail to meet at least one water quality standard, all urban streams essentially "flunk." Therefore, the index is designed to "grade on a curve" to distinguish areas with the most serious pollution issues.

The water quality index summarizes physical, chemical, and microbiological data collected at 33 locations in and around the City of Durham.

2004 Water Quality Index Results

The water quality index results for 2004 are summarized in Figure 1. Red indicates the poorest water quality. At the other end of the color range, dark green shows high quality water. In between the extremes is a range of conditions: yellow-green indicates some pollution, while light orange through dark orange indicates increasing pollution.

Colored areas in the map correspond to the area that contributed to the index result. These areas are called ***watersheds*** or ***catchments***. This shows the source area of the water and pollutants. In general, stormwater runoff draining from highly urbanized watersheds degrades water more than less developed areas. The water quality index helps pinpoint which areas contribute the *most* pollutants to our waterways.

The water quality index shows high quality water in streams monitored in the northern part of Durham County: Flat River, Little River, and Eno River. It also shows high quality water in the section of New Hope Creek that flows through Duke Forest before entering Durham County near Erwin Road. The pollution sources that contributed to the poorest water quality are found in the red-colored areas . Durham Stormwater Services will be working with the public to find and eliminate sources of pollution in these areas in the coming year.

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What is a Watershed?

The term *watershed* describes an area of land that drains downslope to the lowest point. The water flows downhill over the land surface and then through a network of drainage pathways, both underground and on the surface. Generally, these pathways converge into streams and rivers, which become progressively larger as the water moves downstream.

Watersheds can be large or small. Every stream, tributary, or river has an associated watershed. Small watersheds join to become larger watersheds. The term *catchment* is often used to refer to a small watershed, while *river basin* is used to refer to very large watersheds.

Because water moves downstream, any activity that affects the water quality, quantity, or rate of movement at one location can affect locations downstream. For this reason, everyone living or working within a watershed needs to cooperate to ensure good watershed conditions.

What contributes to poor water quality?

Stormwater runoff picks up a variety of pollutants as it runs over roofs, gutters, driveways, streets, and parking lots into storm drains. Storm drain outlets release this polluted runoff directly into creeks, without treatment. Cars and trucks are a major source of pollutants. Stormwater runoff picks up copper and zinc from brake and tire wear, nitrogen emitted from exhaust pipes, and other chemicals in vehicle wash wastewater. Stormwater also picks up nutrients and organic matter from lawn fertilizers, landscape mulch, decaying leaves and grass clippings. Other pollutants carried by stormwater are from pet wastes, pesticides, and motor oil.

The above types of pollution are often referred to as *nonpoint source pollution*. They come from normal, everyday activities of Durham citizens.

Why do some developed areas have poorer water quality than others?

All urban streams in Durham show signs of degradation from the impacts of urban stormwater runoff. However, some areas are clearly much worse than others that have similar land uses. Stormwater runoff alone does not explain why some areas have much worse water quality than others.

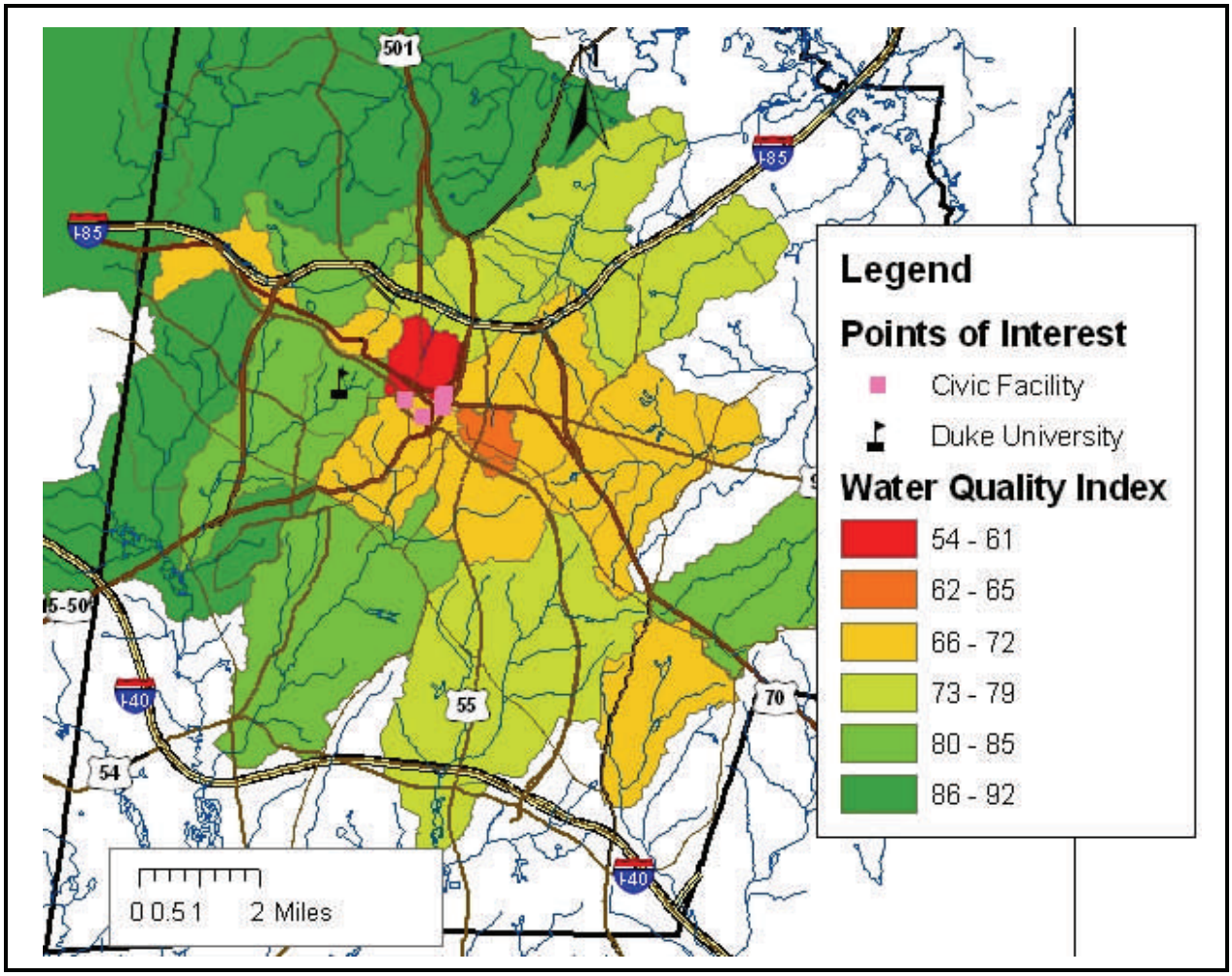

Figure 1: City of Durham Water Quality Index

Illicit discharges are another source of pollution in urban areas. In contrast to the widely dispersed activities associated with nonpoint source pollution, illicit discharges typically occur at specific locations. Illicit discharges include illegal dumping, such as pet owners disposing of pet wastes in the stormwater system. Illicit discharges also include discharges from failing septic systems and leaky sanitary sewers, overflows from clogged sanitary sewer systems, and direct connections of private sanitary sewer laterals to stormwater pipes instead of sanitary sewer pipes.

Studies have shown that dry weather illicit discharges often contribute greater pollutant load than wet weather stormwater discharges.

The City looks for illicit discharges to eliminate them. One of the goals of monitoring is to identify target areas where such discharges are most likely to be found. Finding and eliminating illegal discharges can improve water quality much faster than anything else the City can do.

Where is the red target area located?

The red area extends from Mangum Street on the east to Watts Street and part of Duke East Campus on the west, and from East Chapel Hill Street on the south to roughly Englewood Avenue on the north. The red area includes parts of the Trinity Park, Duke Park, and Old North Durham neighborhoods.

The water quality monitoring station for the red area is located on South Ellerbe Creek at Knox Street. This station had the highest concentrations of fecal coliform bacteria of all the stations monitored. This location also had elevated water quality concerns related to total nitrogen, biochemical oxygen demand (BOD), and copper. Fecal coliform bacteria, nitrogen

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and BOD are usually associated with sewage although there may be other sources.

Where is the dark orange target area located?

The dark orange area extends from Driver Street on the east to Ramseur Street and N. Dillard Street on the west and from NC 147 (Durham Freeway) on the south to Holloway Street on the north. It includes part of the East Durham neighborhood (Northeast-Central Durham).

The water quality monitoring station for the orange area is located on Goose Creek at Holloway Street. This station had the second highest concentrations of fecal coliform bacteria. This location also had elevated water quality concerns related to total nitrogen, BOD, and copper.

What can I do to improve water quality?

You can help! In the City of Durham, stormwater runoff does **not** go to a treatment plant – it goes directly to our streams. Illicit discharges are often associated with water that looks different and/or smells different.

Report any of the following:

- Green algae growing in an unusual location or in excessive amounts (example: algae in street gutter).
- Unusual smell coming from a storm drain or creek. (Note – sometimes you can smell odor coming from the sanitary sewer – this is to be expected and does not indicate a problem.)
- Illegal dumping into a storm drain or creek.

Many illicit discharges do not have constant flow, which can make them difficult to find. When reporting a problem, please indicate what time you observed a particular discharge.

You can also prevent pollution while caring for your home, vehicle, lawn, and garden by following a few simple tips:

- Keep trees and shrubs growing along stream banks as buffer zones to filter soil and runoff from entering waterways.
- Properly dispose of oil-based paints, cleaners, and solvents at the Household Hazardous Waste Collection Center (1900 E. Club Blvd., 560-4381).
- Use only non-toxic, biodegradable cleaners when pressure washing or try using just water.
- Pick up pet waste and dispose of it with the trash.
- Direct rainwater from your down spouts to vegetated areas or collect rainwater in a barrel.
- Routinely check your car for leaks and keep it tuned up.
- When changing fluids from your vehicle, drain into a clean container and seal completely. Take the oil and oil filters to a used oil collection site.
- Take vehicles to a commercial car wash where the wash water is treated and/or recycled.
- When washing your car at home, runoff should drain to a vegetated area, not the driveway/street.
- Use fertilizers, herbicides, and pesticides sparingly. Read labels carefully and do not apply before rain. Clean up any excess.
- Select drought resistant native plants that conserve water and control runoff.
- Do not leave grass clippings or yard waste along curbs or ditches. Compost or use yard waste carts.
- Sweep up debris instead of hosing down your driveway.

For more information, visit our website at **http://www.durhamnc.gov/departments/works/stormwater.cfm** or call Stormwater Services at 560-4326.

To report a water pollution problem:

Call the Public Works Department, Stormwater Services Division at **560-4326** from 8 a.m. to 5 p.m. Evenings and weekends, call the confidential water pollution hotline at **560-7946 (560-SWIM).**

Clean water begins with you and me!